



Toward a Watershed Monitoring Framework for the Toronto Region

Based on a public
workshop co-sponsored
by the Toronto and Region
Remedial Action Plan
and the Great Lakes
Water Quality Board
of the International
Joint Commission

1999

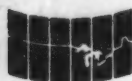


TORONTO & REGION
REMEDIAL ACTION PLAN

WATERFRONT TRUST 



THE TORONTO AND REGION
CONSERVATION AUTHORITY



Great Lakes
Water Quality
Board

Report to
the International
Joint Commission

Toward a Watershed Monitoring Framework for the Toronto Region

For more information, please visit our websites:

Toronto and Region Conservation Authority
www.trca.on.ca

Waterfront Trust
www.waterfronttrust.com

Toronto and Region Remedial Action Plan
www.cciw.ca/glimr/raps/ontario/toronto/intro.html

International Joint Commission
www.ijc.org

ISBN 1-894280-11-3

Printed in Canada ☼

Photos:
Images are courtesy of the
Toronto and Region Conservation Authority
except as noted

Table of Contents

Introduction	1
Workshop Design and Structure	1
Preparing for the Watershed Monitoring Workshop with the WQB	1
Watershed Monitoring Workshop	2
Output from Round-table Discussions on the Monitoring Framework, Indicators, and Approaches	7
Monitoring Indicators	7
Process for Developing the Monitoring Framework	8
Main Issues to Consider During the Future Development and Implemen- tation of the Monitoring Network	9
Potential Role of the WQB and IJC in Facilitating the Successful Implementation of a Watershed Monitoring Network	11
Key Findings and Recommendations	12
Appendix 1	13
May 12, 1999 Presentation to IJC Humber Watershed Alliance and Watershed Regeneration Council	14
Appendix 2	15
Workshop Program	15
Appendix 3	17
List of Participants	17

INTRODUCTION

The Toronto and Region Remedial Action Plan (RAP) and the Great Lakes Water Quality Board (WQB) of the International Joint Commission (IJC) held a public workshop on watershed monitoring and management in Toronto, Ontario on May 13, 1999. The WQB is principal advisor to the IJC on policy matters relating to the Canada-United States Great Lakes Water Quality Agreement. The Board is made up of senior program managers from regional, state, provincial, and federal regulatory and resource management agencies. The Toronto and Region RAP is a blueprint for restoring beneficial uses along the waterfront and throughout the watersheds. The Waterfront Regeneration Trust and The Toronto and Region Conservation Authority are the local coordinating agencies for the RAP. These two agencies help the provincial and federal governments fulfill their responsibilities for the RAP under the Great Lakes Water Quality Agreement. This public workshop was one in a series of workshops to support the RAP process in Toronto and fulfilled a WQB ongoing objective to improve public involvement and consultation. The purpose of the workshop was to:

- learn about and discuss a proposed monitoring framework designed to provide the necessary information to assess the health of watershed ecosystems progress toward restoring beneficial uses, and to provide guidance on making management decisions;
- use facilitated breakout sessions to obtain feedback on the adequacy and practicality of the proposed monitoring framework and innovative monitoring approaches;
- learn about and discuss recent advances in data interpretation tools to help make sediment management decisions; and
- provide advice on how the WQB and IJC can assist in bringing these issues to the attention of federal and provincial governments.

"You know you've arrived when you have a line item in the municipal budget to address watershed regeneration" — Honorable David Crombie, Chair, Waterfront Regeneration Trust



Lois Griffin, chair of the Humber Watershed Alliance, presented recommendations to accelerate the restoration of beneficial uses in the Toronto AOC (see Appendix 1)

WORKSHOP DESIGN AND STRUCTURE

Preparing for the Watershed Monitoring Workshop with the WQB

In preparation for the public workshop with the WQB, a pre-meeting was convened on April 12, 1999 with over 30 local stakeholders of the Don Watershed Regeneration Council (Don Council) and the Humber Watershed Alliance (Humber Alliance). The Honorable David Crombie, Chair Waterfront Regeneration Trust, addressed participants at the pre-meeting. This pre-meeting was held to provide local stakeholders with an understanding of the Great Lakes Water Quality Agreement and the role and responsibility of the WQB. In addition, some preliminary recommendations were developed and subsequently presented to the WQB by Lois Griffin (Chair of the Humber Alliance) and Mark Wilson (Chair of the Don Council) at a reception held on the evening of May 11, 1999 at the Black Creek Pioneer Village. A summary of the preliminary recommendations is presented in Appendix 1.

In addition to developing preliminary advice for the WQB, considerable work on a watershed monitoring framework was undertaken to lay the foundation for the May 13th public workshop with the WQB. The proposed watershed monitoring framework for the Toronto RAP area was initiated with the development of draft discussion papers on monitoring in each of three topic areas:

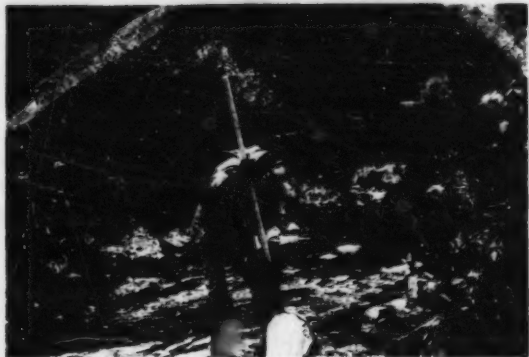
- water quality;
- water quantity; and
- aquatic habitat and species.

A series of focus groups were consulted during the development of the papers and a stakeholder workshop was held on April 21, 1999. The consultations included staff from local and regional municipalities, government agencies, academics, consultants and interest groups. The input received was used to develop the concept of the watershed monitoring framework presented at the May 13th public workshop.

Watershed Monitoring Workshop



Waterfront Regeneration Trust



The May 13th workshop began with a welcome from Craig Mather the Chief Administrative Officer of the Toronto and Region Conservation Authority and member of the IJC's Great Lakes Water Quality Board, and from Vic Shantora the Canadian Chairman of the Great Lakes Water Quality Board. Craig Mather and Suzanne Barrett from the Waterfront Regeneration Trust gave a brief overview of the status and progress of the Toronto and Region RAP (see Appendix 2 for the workshop program). They noted that the Toronto and Region RAP Team was initiated in 1987. In 1991, the RAP Team completed the Stage I report, which identified impaired uses and their causes. The Stage 2 Report (Clean Waters Clear Choices) was completed in 1994 and contains 53 recommendations for action to restore the polluted waterways and waterfront in Toronto and Region. The Toronto and Region RAP is now in a stage of implementation and action. The Toronto and Region Conservation Authority is working closely with the Waterfront Regeneration Trust, Environment Canada, and Ontario Ministry of Environment on implementation of the Toronto and Region RAP under a Four-Party Memorandum of Understanding. The process of implementing the RAP, however, involves a much broader spectrum of players.

Next participants heard a presentation on the proposed watershed monitoring framework from Sonya Meek, Water Management Planner in the Resource Science Section of the Toronto Region Conservation Authority. Sonya

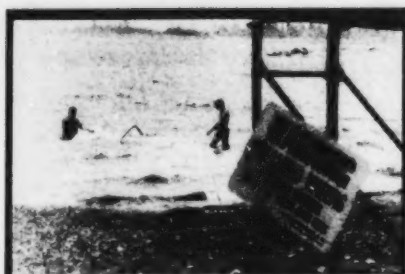
Meek provided a review of the monitoring requirements in a watershed context and illustrated how an integrated Watershed Monitoring Network would fulfill the needs of RAPs as well as individual watershed and waterfront councils, and the municipalities in the area. The Watershed Monitoring Network would: provide necessary information to assess watershed/waterfront health; be efficient; and have agreed upon monitoring and reporting standards among the stakeholders. The development of the Watershed Monitoring Network is ongoing, and will continue to include direction and input from various agencies, municipalities, and the public. The monitoring indicators selected for the Watershed Monitoring Network will reflect a spectrum of environmental effects, stressors and management responses/activities. Biomonitoring indicators will form the "front line" by providing important information that integrates the environmental conditions in a watershed. The Watershed Monitoring Network will be made up of the collective efforts of monitoring agencies and groups which, in many cases, already carry out various monitoring activities. Target setting and reporting will be conducted on a watershed basis.

Following the overview of the watershed monitoring strategy, participants heard three presentations on specific monitoring approaches: biomonitoring; municipal monitoring; and algal community monitoring. Wolfgang Scheider of Ontario Ministry of Environment described two biomonitoring programs conducted by the Ministry of Environment in streams and lakes of the Toronto Area of Concern (AOC), and also summarized some of the results from the biomonitoring studies from the Great Lakes. The Sport Fish Contaminant Study analyses the fish tissue of all sizes of sport fish collected from the entire length of the Toronto waterfront, eight inland water body, and four stream sites in the AOC. Fish tissue is analyzed for mercury, PCBs, organic pesticides, and dioxins/furans. Results from Lake Ontario (including the Niagara River and St. Lawrence River) indicate that 57 % of sport fish have no consumption restrictions, 40 % have partial restrictions (4, 2 or 1 meal per month), and 3 % are completely restricted. Compared to the entire Great Lakes Basin, Lake Ontario has 10 % more partial consumption restrictions than the rest of the basin. In Ministry of Environment's Juvenile Fish Monitoring Program, juvenile fish are collected annually from a subset of approximately 10 of 43 sites in the Toronto RAP watersheds and analyzed for contaminants of concern. Juvenile fish are collected because they tend to remain in one area of the stream during their first year of life. Fish high in contaminant concentrations can therefore identify areas where elevated organics and metals exist within a watershed. PCB concentration in juvenile fish collected from the Humber River has significantly decreased from approximately 2,000 ng/g in 1975 to 100 ng/g in 1995. Ministry of Environment's biomonitoring programs are an integral part of "front-line" monitoring because they integrate the environmental condition of the watersheds and provide valuable information about the present state of the watershed.

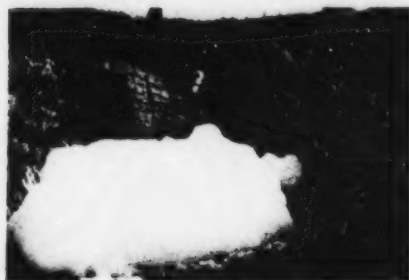
Ted Bowering of the City of Toronto gave a presentation of municipal monitoring. Municipal monitoring varies between municipalities in the Toronto RAP area and encompasses a range of activities. Traditional monitoring focuses on the following uses: suitability for a specific use (e.g., beach closings, water supply); catching polluters (e.g., sewer out-fall monitoring); and performance monitoring (e.g., treatment plants, stormwater management systems). More recently, monitoring has been employed for research purposes, model calibration/development, and state of the environment reporting. Municipal monitoring assists the municipality in making decisions about the use



One use of monitoring data.



Waterfront Regeneration Trust



City of Toronto Works and Emergency Services

Bacteria testing at public beaches and sewer outfall testing are two types of municipal monitoring activities.



Jack Layton, Toronto Councillor and Co-chair of the City of Toronto's Environmental Task Force, linked the importance of monitoring efforts to Toronto's sustainability.

4

of the land for a variety of purposes, including housing, transportation, recreation, and natural area reserves. In addition, monitoring addresses municipal concerns about the quality of life and sustainability in the area. The main challenges facing municipal monitoring is to find a balance between traditional monitoring, which utilizes grab samples, and long-term monitoring which would benefit from using indicators that integrate environmental conditions over time. Areas in which the City of Toronto could use assistance are identifying indicators, interpreting/analyzing monitoring results, and relating changes in indicators to management decisions. Ted Bowering noted that he did not envision the complete coordination or centralization of all monitoring activity in the watershed because different agencies have their own specific needs and objectives. He does believe, however, that stakeholders should act upon present opportunities for coordinated monitoring efforts and partnerships.

Marianne Douglas, an Assistant Professor of Geology from the University of Toronto, then gave a presentation which outlined the role of biological monitoring as an integrating indicator of environmental conditions in a watershed, and identified algae, along with fish and invertebrates as commonly used bio-indicators. Algae are excellent biomonitors for environmental assessments because they are common and widespread throughout all watersheds, they form the base of the food chain, there are hundreds of different species, and they are sensitive to environmental conditions, especially water chemistry. Algae have been successfully used to monitor the following aquatic conditions: nu-

trient surplus (i.e., eutrophication), turbidity and siltation, organic enrichments, high salinity, contamination by metals, and acidification. Professor Douglas identified several programs throughout the world that have utilized algae monitoring. The benefit of using algae as a biomonitor is its low cost relative to other traditional monitoring methods as well as the non-destructive collection methods of algae sampling. In addition, algae are often the first group of organisms to be impacted by shifts in physical and chemical conditions in a watercourse, including the introduction of pollutants at relatively low concentrations, because of their strong connection to basic water chemistry and their short life cycles. As such, algae can provide an "early warning system" of change in a watershed.

Facilitated round-table sessions were then used in the workshop to provide stakeholder feedback on the proposed indicators and suggest next action steps (see Appendix 2 for the workshop program). During lunch, participants heard a stimulating and provocative keynote address on the importance of a grassroots watershed RAP process by Jack Layton, Toronto Councillor and Co-Chair of the City of Toronto's Environmental Task Force. Later in the afternoon, workshop participants learned about the status of sediment quality in the Toronto Area of Concern and recent advances in data interpretation tools to help make sediment management decisions.

Duncan Boyd from Ontario Ministry of Environment highlighted the importance of a sediment quality assessment in an environmental monitoring program and the current sediment quality conditions in the Toronto Bay. Clean sediment provides healthy habitat for animals at the base of the



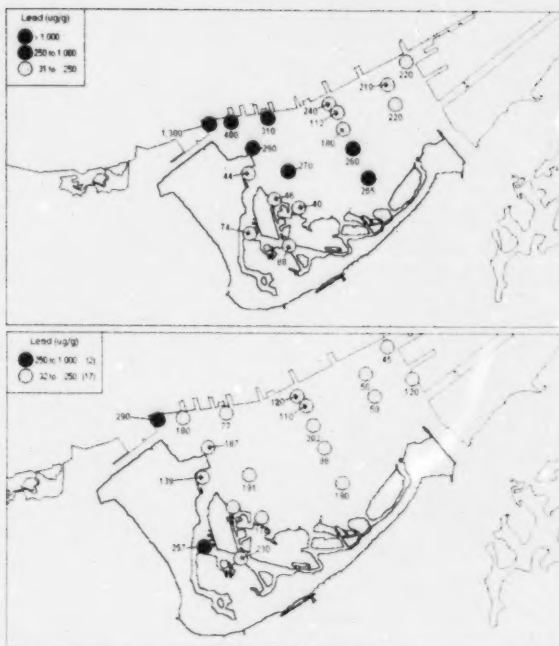
University of Toronto



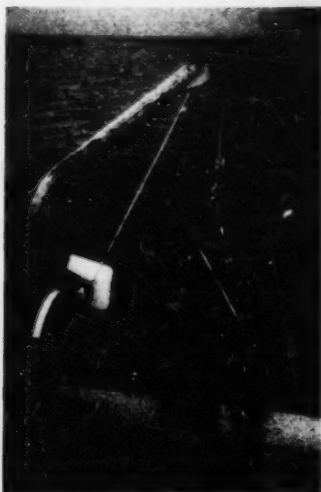
Algae — another potential biomonitor

aquatic food web, and ensures a diverse food source for fish and aquatic animals free from toxic effects. Contaminated sediment can kill or impair the growth and reproductive function of desirable benthic invertebrates. In addition, contaminants such as PCBs in sediment can bioaccumulate through the food web and lead to harmful concentrations in "top predators" such as fish-eating birds and humans.

Two beneficial use impairments in the Toronto RAP directly relate to sediment quality: restrictions on dredging activities, and degradation of benthos. Inner Toronto Harbour sediment conditions are "fair" with demonstrable improvement over the past 20 years for metals, particularly lead. Many areas exhibit concentrations of nutrients, metals, and PCBs/organochlorine pesticides below the "severe effect level", but above their "lowest effect level" (the concentration that can be tolerated by the majority of benthic organisms). An examination of the benthic community structure revealed that oligochaetes, typical of organically enriched areas, were the most common component of the community. Toxicity tests inhibited the growth of certain species, demonstrating that current water and sediment quality conditions are still limiting colonization by pollution sensitive species, however the absence of any lethal effect from exposure is a good indication that direct toxic effects on benthos are not an issue in the waterfront. The results provide no indication of a need to alter the present RAP strategy of source control.



1978 (top) and 1995 lead concentrations ($\mu\text{g/g}$) in Toronto Harbour Sediment. D. Boyd, MOE.



Next, Trevor Pawson and Keith Somers of Ontario Ministry of Environment identified a need to evaluate sediment quality data simultaneously with biological and chemical data in order to draw conclusions on the ecological effects of sediment contamination. The various types of monitoring data were outlined and included sediment descriptors (e.g., physical characteristics, metal and organic concentration), and biological descriptors (e.g., bioassays, benthic community structure). Various methods for linking sediment attributes were described, and the Mantel test was applied to data from Toronto Harbour. The statistical methods used to analyze the data matrices of the Mantel test worked well with varying numbers of sites and variables, and successfully removed the confounding effects of sediment particle size. In Toronto Harbour, the benthic community structure and the bioassay matrices were correlated with sediment particle size and metal concentrations. Although the test successfully demonstrated that statistical methods do exist to link

large chemical and biological data matrices together and draw defensible conclusions on the ecological effects of sediment contamination, this should be thought of as only one step in the decision toward the need to remediate. Whether or not to remediate must be decided with a complete risk assessment.

The sediment portion of the program concluded with:

- an overview of the work of the Great Lakes Water Quality Board's Sediment Priority Action Committee by Kelly Burch of Pennsylvania's Office of the Great Lakes; and
- a summary of key advice in applying analytical tools to make sediment management decisions by Gail Krantzberg of Ontario Ministry of Environment.

Gail Krantzberg outlined a decision-making process that could be applied for making sediment management decisions beyond source control. The decision making elements which affect sediment management actions include: lethal/sublethal chronic effects, bioaccumulation potential, the severity of ecological effects, type of contaminants, benthic communities, nature/extent of fish tumours, human health risk, fish and wildlife risk, physical stability of deposits, control of contaminants at source, economics, the social and legal circumstances, and available technologies. Equally important to the collection of data is sufficient attention be placed on thorough and comprehensive interpretation of the data. The use of minimally disturbed "reference sites" for comparison with test site data is an approach that could be used consistently across jurisdictions to determine the severity of environmental effects. The community structure of the test sites should be comparable to the reference sites if contaminants are not exerting ecological stress. An evaluation of the severity of the ecological stress along with a risk assessment and consideration of the decision making elements will provide a basis for sediment management decision making.

The May 13th workshop concluded with a facilitated plenary discussion of how the WQB and IJC can assist in bringing these issues to the attention of federal and provincial governments. Over 100 people participated in the workshop (see Appendix 3 for complete list of registrants).

OUTPUT FROM ROUND-TABLE DISCUSSIONS ON THE MONITORING FRAMEWORK, INDICATORS, AND APPROACHES

The workshop used facilitated round-table sessions to obtain feedback from all participants and generated considerable discussion. As noted in the workshop program in Appendix 2, the round-table discussions were used to address four main themes consistent with the workshop design:

- monitoring indicators;
- process for developing the monitoring framework;
- main issues to consider in developing and implementing the monitoring network; and
- potential role of the WQB and IJC in facilitating the successful implementation of a watershed monitoring network.

Presented below is a brief summary of the output from each of these breakout sessions.

Monitoring Indicators

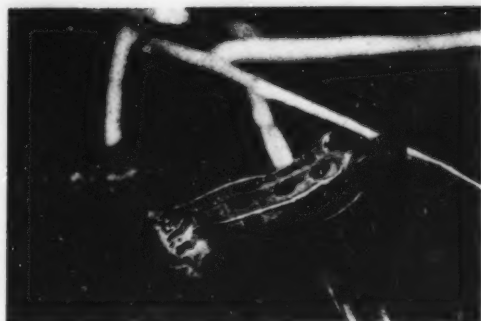
Monitoring is a critical element in the management of watersheds. Participants pointed out the lack of good historical or baseline information on many indicators from both urban and rural reference sites. In the future more emphasis needs to be placed on the use of reference sites. In addition, experience has shown that follow up comparisons from one area to another are relevant and cost-effective. It was suggested that priority be given to indicators that make sense and are important to the public (they must be relevant and understandable). The RAP should consider using a similar indicator approach used in existing watershed report cards (e.g., Don River and Humber River). Indicators should give a quick snapshot of the existing condition at a particular time. There is a need to identify and understand the effects of change in the watersheds. Stressor indicators need more emphasis in monitoring, especially nonpoint sources. There must be a good understanding of the integration of and interaction among indicators. For example, more work should be undertaken to relate biomonitoring results with physiochemical conditions and to consider the effects of energy flows through the system. Social, economic, and health indicators need to be added to future monitoring programs and must be seen in the "front line" (e.g., public health).



Brook trout — as an indicator of high quality cold water habitat.



Common tern — as an indicator of a healthy waterfront.



It was generally accepted that indicators must be prioritized based on resources, availability of existing programs, base growth, RAP priorities, and direction of monitoring results. More emphasis must be placed on tableland resources and associated indicators/measures (e.g., agricultural practices affect the habitat in these upland areas). Groundwater also needs more emphasis, especially in the area of Oak Ridges Moraine. Further, there should be a groundwater and surface water link. Participants noted that some IJC impaired uses are not being addressed (e.g., fish tumours/animal deformities). The aquatic invertebrate community is a good integrator/indicator. Algae may be particularly useful as an indicator as

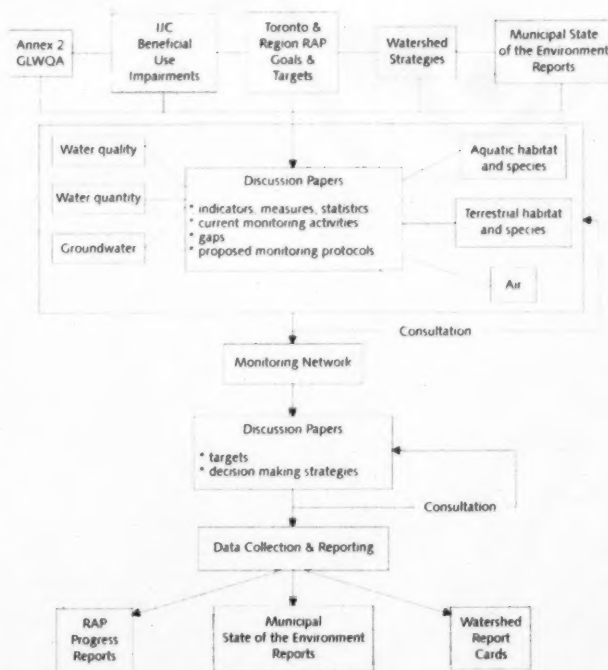
well. The terrestrial community should be broken down into more specific indicators, including sentinel plant and animal species. There is also a need to incorporate "land-use change" as an indicator as this has a significant impact on ecosystem health, especially in the headwater areas of the watersheds. Another suggestion was to consider adding prevention-based indicators/measures.

Process for Developing the Monitoring Framework

Participants called for clarification of the consultation process (e.g., Who is being consulted?). For example, there is a need for clarification of public and NGO role/involvement in the framework development (e.g., consultation, community monitoring, education). Participants felt that the process should be inclusive (i.e., communities, scientists, agencies, etc.). Industry must also be part on an integrated monitoring network (e.g., discharge monitoring). It was also felt that the mechanism for implementation requires clarification. Issues which must be addressed include:

- implementation details are lacking (e.g., How will information be accessible, integrated and reported?);
- guidelines on where to find this information so others can retrieve it;

DEVELOPMENT OF THE TORONTO REGION MONITORING FRAMEWORK



- clarity of how reports guide or translate into management action; and
- assurance that data will be used by management and result in municipal action (i.e., assess, set priorities, and take action in a continuous improvement process).

Again, participants identified the need to elucidate the link between monitoring results and watershed stresses/causes. It was also suggested that efforts be made to tie in public stewardship to the network (i.e., not separate from monitoring). For example, storm water management efforts could include public responsibility for disconnecting down spouts and use of low-volume toilets.

Larger agreements like the Canada-Ontario Agreement should have monitoring commitments tied to them. Key issues include:

- there is a strong need to show feedback between results and the goals/targets of the monitoring network by incorporating the "adaptive management" concept into the framework;
- stakeholders must be convinced that the network can still continue if resources become unavailable in certain programs; and
- the framework must be flexible enough to change with the pace of knowledge, incorporate emerging methodologies, and continue even in the reality that an agency's capacities may change.

A mechanism for ongoing dialogue among stakeholders is required. Clear goals must be established (i.e., monitoring for what purpose). In the future there will undoubtedly have to be more community involvement or "grass roots" level action for smaller monitoring projects with standard methods and protocols. An inventory or directory of "who is doing what" should be readily available to stakeholders. It was suggested that instead of trying to satisfy many different goals and objectives with limited resources, try satisfying different issues in different time frames.

Main Issues to Consider During the Future Development and Implementation of the Monitoring Network

This breakout session also called for a clear definition of the purpose(s) of monitoring (e.g., protection of what we have, tracking changes, etc.). Funding is essential. Key funding issues include:

- lack of commitments, such as a *memorandum of agreement* or *understanding*, between network stakeholders on what will be monitored, by whom, and for how many years so trends can be determined (the network has not yet been established); and
- the need for stakeholders to explore alternative funding sources (e.g., foundations, NSERC grants).

As an initial step, gaps in monitoring activities need to be identified and filled. If some monitoring activities are not going to be completed, people need to know the consequences of not filling gaps.

Participants also noted the importance of identifying the benefits of a monitoring network. There must be stakeholder buy-in for the monitoring network and the network must be set up in a way to document improvements. Monitoring priorities and a "core program" must be established.

Coordination of monitoring efforts will be essential. Participants suggested a coordinator of the monitoring network be established to consider logistical issues covering a large, complex area with many stakeholders. Another option would be to select an agency to be responsible for coordinating all monitoring activities, but this would not be consistent with the network model.

Monitoring approaches/methodologies should be "shopped around" to make sure that municipal jurisdictions agree with and in fact, will use the proposed approaches. Monitoring needs to be tailored to each watershed or subwatershed (i.e., not all indicators and measures may make sense in every watershed, therefore approaches must be flexible). Efforts will be required to resolve issues related to the storage of information/data, data access, etc. Municipal agreement on consistent methodologies will be essential. The network can be built on existing monitoring initiatives. Participants noted there is a need to clarify reporting procedures (e.g., institutionalize the report card so everyone feels it's "theirs", not just a report card of the Toronto and Region Conservation Authority).

How decisions get made is essential. Key decision-making needs include:

- determine and articulate how the information will be used for decision-making; and
- obtain commitments in the political agenda to ensure management decisions will look at monitoring results.

Community involvement and understanding/education should be built in (e.g., public consultation and education is essential in order to get personal commitments, which in turn will generate political and economic support). Implementing the network for one "trial" watershed was suggested. This allows learning from the success/failure before attempting efforts on all watersheds. Participants suggested including those who oppose monitoring in discussions in order to convince them of its importance. This may require economic analysis (e.g., What does clean water and healthy fisheries mean to tourism, development, etc.?). Targets/criteria to evaluate results of monitoring need to be defined from baseline data (e.g., consider setting area-specific targets like sustainable loads for each watershed or total daily intakes).

A communication strategy is essential. Stakeholders (e.g., provincial, municipal, community level) need to have access to information regarding previous and existing monitoring activities. This information could be placed on the Internet, with a monitoring directory. The information should be easily understood and useful to the public. Other suggestions regarding communication included:

- public awareness/education efforts should include, among other things, providing phone numbers to call for reporting aesthetics concerns such as dumping, establishing Internet addresses to report spills, and implementing specific public outreach activities to explain why monitoring data are important and long-term commitments are necessary;
- mechanisms for reporting/demonstrating results need to be defined and followed (e.g., Will a central clearing house be established? Will all results be posted/made available on one Internet site?);
- baseline data will be required for decision-makers; and
- reporting on progress should be completed on a frequent and regular basis.

Potential Role of the WQB and IJC in Facilitating the Successful Implementation of a Watershed Monitoring Network

Participants noted that the WQB and IJC are in unique positions to help deliver local messages to senior levels of government. There is a need to emphasize that land use is critical to the health of the Great Lakes, including habitats, surface water, and groundwater. Efforts must be made to highlight the impact of runoff on watershed health. The WQB and IJC can help stress to municipal stakeholders the importance of watershed initiatives in supporting the health of the Great Lakes, as well as how watershed efforts complement lakewide management plans (LaMPs). This subsequently can help raise the profile and importance of watershed efforts. Other suggestions (please note that these were suggestions from participants of the workshop and do not necessarily represent the views of the WQB) on how the WQB and IJC can help establish and sustain a watershed monitoring network include:

- funding and expertise from the Provincial and Federal government for trend monitoring;
- publicize the importance/value of monitoring, thereby increasing the interest and support of the general public;
- support programs which foster behavioral change (e.g., social marketing, down spout disconnect programs, rain barrels);
- recommend that the Parties do more public communication on the state of the lakes;
- provide a link between government monitoring programs and local/municipal monitoring;
- advocate that governments find innovative sources of funding to help get through financially and/or politically "lean years" (e.g., put greater tax on water use to encourage conservation and use some of the proceeds for monitoring; add a mandatory monitoring fee to Certificates of Approval);
- assist with making sure data are interpreted and explained;
- assist in the development of a system to share information among Areas of Concern (e.g., the WQB and IJC can serve as a broker of information on useful approaches and techniques in other Areas of Concern and by establishing "SWAT" teams to take good ideas from one Area of Concern to another);
- recommend that public environmental education be re-instated to political and policy agendas;
- support protection of resources in more pristine areas of the Area of Concern such as the Oak Ridges Moraine (e.g., groundwater, baseflow, etc.);
- encourage enforcement of laws and regulations;
- recommend use of small-scale, low impact sewage treatment operations;
- recommend effective land use planning to curb urban sprawl;
- raise key environmental protection issues during elections;



Rain barrels are an easy way the community can reduce urban stormwater runoff.



Protection of resources such as the Oak Ridges Moraine in the Toronto and Region AOC was suggested.

- consider including municipal representatives on the WQB, especially after the municipal downloading that has recently taken place;
- be a catalyst for coordinating groups involved in monitoring in the Toronto and Region Area of Concern;
- document and broadly communicate the decline of government resources and expertise required for monitoring, analysis, and interpretation, as well as for implementing the RAP;
- provide a detailed "delisting" process and set of "delisting" criteria; and
- make better use of community newspapers and media, not only the national press, when issuing news releases and reports to reach local communities (i.e., be more creative in public outreach that targets different cultures/languages by using radio or video spots with language voice-overs).



Alice Chamberlin, IJC Commissioner, addressing workshop participants.

KEY FINDINGS AND RECOMMENDATIONS

The May 13th workshop was well received by all participants and generated considerable discussion and output. Presented below are the key findings and recommendations from the workshop.

- There is strong support for the establishment of an interagency monitoring network within the Toronto Region. It was felt that a coordinated monitoring network would help to eliminate duplication, and ensure monies were spent more effectively on monitoring.
- There was a recognition of the need for monitoring data to be linked to watershed stresses/causes and the appropriate management actions required to solve problems that arise. Participants felt that the results of monitoring must eventually lead to management actions in a process of continuous improvement.
- The process of developing the monitoring network should be inclusive not exclusive. Consultation should include agencies, municipalities, non-government organizations, industry, academics, consultants, and the public.



Urban/stormwater runoff, a significant source of stream and lake pollution, can be improved with stormwater management facilities.



Vic Shantora, Canadian Co-chair of the Great Lakes Water Quality Board (WQB), presents a plaque of appreciation to the Toronto and Region Remedial Action Plan, accepted by Craig Mather, CAO of the TRCA and member of the WQB.

-
- In AOCs that contain a significant amount of urban development, surface runoff from these developed areas can be the most significant source of poor water quality and impairment of beneficial uses. The Great Lakes Water Quality Board and the International Joint Commission should advocate for the development of an urban/stormwater runoff annex to the Great Lakes Water Quality Agreement.
 - There needs to be a role for the public and educational institutions in collecting monitoring data. The "grass roots" involvement will be important in smaller specific monitoring projects and in developing support for larger monitoring activities.
 - Based on the importance of monitoring to good decision-making and the trend in recent years to reduced budgets and subsequently, reduced monitoring activities, the Great Lakes Water Quality Board and the International Joint Commission should take a leadership role in emphasizing the need to secure long-term funding and expertise from the provincial and federal government for watershed based monitoring.

"What I found most fascinating at this workshop was the level of public understanding of the important role monitoring plays in our collective efforts to clean up our watersheds and our Great Lakes, and the public's recognition that governments and agencies were reducing their level of effort rather than increasing or at least maintaining their monitoring programs."

— Craig Mather, CAO, TRCA

APPENDIX 1

Presentation to:
Members of the International Joint Commission
and the Great Lakes Water Quality Board

Wednesday May 12, 1999
Black Creek Pioneer Village, Toronto, Ontario

by:
Lois Griffin, Chair of the
Humber Watershed Alliance
and
Mark Wilson, Chair of the
Don Watershed Regeneration Council

BACKGROUND

In preparation for the meeting of the Great Lakes Water Quality Board in Toronto, May 12-14, 1999, a meeting was convened on April 12, 1999 with over thirty members of the Don Watershed Regeneration Council (Don Council) and the Humber Watershed Alliance (Humber Alliance).

The Don Council and Humber Alliance are unique Committees which have been formed to oversee the implementation of watershed strategies for the Don River and Humber River respectively. These groups possess no legal or statutory powers. Instead they function as advisory bodies to the Toronto and Region Conservation Authority (TRCA) and as conduits to their respective watershed communities. They are, in essence, the embodiment of community-based planning principles as applied to watershed health. Because they are defined by watershed and not by political boundaries, they can effectively advocate for ecosystem based actions and policies at the watershed level. Membership includes representatives from local and regional municipal councils, agencies, and community members.

The April 12th meeting was held to provide members with an understanding of the Great Lakes Water Quality Agreement and the role of the Water Quality Board and its relationship to the Area of Concern. Following an overview by Mike Goffin of Environment Canada (Ontario Region), an open discussion was facilitated by Craig Mather, Chief Administrative Officer (CAO) of the TRCA and a Canadian member of the WQB. Lois Griffin, Chair of the Humber Watershed Alliance, and Mark Wilson, Chair of the Don Watershed Regeneration Council subsequently discussed issues raised at the meeting and prepared four specific recommendations for renewed action and commitment that would accelerate the restoration for beneficial uses within the Toronto Area of Concern.

RECOMMENDATIONS

- (26) the International Joint Commission and its Great Lakes Water Quality Board, advocate for the development of an "urban runoff annex" to the Great Lakes Water Quality Agreement and ensure that priority be given to assisting local municipalities/agencies/others with stormwater management infrastructure funding, research, and monitoring.
- (27) the International Joint Commission and its Great Lakes Water Quality Board, and the International Air Quality Advisory Board, accelerate their joint efforts to address the serious issue of air borne pollutant deposition within the Great Lakes basin recognizing that this issue cannot be resolved through local community action.
- (28) the International Joint Commission and its Great Lakes Water Quality Board encourage program development and federal funding for environmental education and awareness stressing new approaches such as community-based social marketing to foster personal behaviour change and ensure that support be focused on innovative partnerships with school boards, other agencies and community based groups for effective delivery at the local level.
- (29) the Water Quality Board, through the International Joint Commission, foster the sharing of timely information on cost and ecologically effective technologies and creative solutions for addressing common causes of use impairments among "like" Areas of Concern.

RATIONALE

The four recommendations provided are based on issues raised at the April 26th meeting and on recurrent issues within the Toronto Area of Concern.

Stormwater

Stormwater is the major conveyor of pollutants in the heavily urbanized watersheds of the Toronto Area. While there is generally a policy to ensure that large scale new developments provide water quality and quantity management, vast areas were developed prior to 1980 when these policies began to be implemented. If the Toronto Area of Concern is to be restored urban runoff issues must be addressed. Clear Water Clear Choices, the 1994 action plan developed for the Toronto Area of Concern, calls for a treatment train approach including source controls, best management practices and end of pipe solutions when necessary. A number of initiatives are underway within the City of Toronto and surrounding regions. However, solutions and retrofits can be costly, and additional research is needed to ensure that the most effective designs are developed. An annex to the Great Lakes Water Quality Agreement will focus resources on critical urban runoff issues.

Air Borne Emissions

Air Borne Emissions and their deposition are recognized throughout the Great Lakes as a serious issue. Within the Toronto Region, air borne particulates are linked to health issues as well as water quality impairments. Smog alerts are becoming common place and local plans to reduce air-borne emissions are being developed. Deposition within the Great Lakes basin, however, must be addressed and advocated for through mechanisms such as the Water Quality Board and its Air Quality Board counterpart. We understand that these two Boards are attempting to work in concert to address these issues and urge that this effort be accelerated. Local watershed/waterfront environmental groups will continue to work at the community level.

Education and Awareness

In November of 1998, the Toronto RAP held a Clean Water Summit in Toronto. Over 150 participants met to discuss pollution prevention, stormwater management/combined sewer overflows, and habitat protection and regeneration. Once again the message was delivered forcefully that education, awareness, and community involvement must be

integral to the restoration and protection of the valued natural resources. We support education programs at the Lake or Great Lakes basin levels that can be developed with the sophisticated visual materials needed to attract and sustain public attention. We also recognize that despite countless efforts to provide useful and attractive materials, behaviour change leading to healthy watersheds doesn't happen easily. What can be done? Our call is for the continuation of strategic education programs including partnerships for delivery at the local level. We also call for new methods such as community based social marketing.

Information Sharing

Throughout the Great Lakes Basin we know that similar impairments result from similar stressors within the system. Are we sharing information that would accelerate our progress towards restoring the health of our watersheds and waterfronts? Are we continually reinventing the wheel? Are research findings getting into the hands of the municipal staff that could use them? Are we learning from RAPs that have similar impairments that have found effective solutions? We see a role for the WQB and the IJC to foster this exchange between "like" RAPs and believe it will accelerate the restoration of our Areas of Concern.

Summary

At the April 12th meeting a number of other questions and issues were raised. Funding, groundwater protection, industry and business involvement, protection of unimpaired watersheds, links to human health, links to LaMPs and other Great Lakes initiatives are concerns for community members actively involved in watershed issues. Others see a need to celebrate the progress being made and to use restoration rather than delisting as our operative. The recommendations in part embody these issues. The Toronto advocates are united in their call for action. Restoration of the watersheds as well as the waterfront is their approach. They look forward to a response to these recommendations.

APPENDIX 2

WORKSHOP PROGRAM

Toward a Watershed Monitoring Framework for the Toronto Region

Thursday, May 13, 1999, 8:30 am - 4:30 pm
Black Creek Pioneer Village, Downsview, Ontario

Program

- | | |
|-------|--|
| 8:30 | Registration |
| 9:00 | Remarks |
| | Opening Remarks and Welcome - Craig Mather, TRCA |
| | IJC Water Quality Board - Vic Shantora, Can. Co-Chair IJCWQB |
| 9:20 | Presentations |
| | Toronto and Region Status and Progress - Suzanne Barrett, WRT |
| | Watershed Monitoring Framework and Proposed Indicators - Bernie McIntyre, TRCA |
| | Specific Monitoring Approaches |
| | (30) Biomonitoring - Wolfgang Scheider, MOE |
| | (31) Municipal Monitoring - Ted Bowering, City of Toronto |
| | (32) Algae Communities - Marianne Douglas, University of Toronto |
| 11:00 | Round-Table Discussion - Monitoring Framework, Indicators, and Approaches |
| | <i>Will the proposed indicators provide the necessary information? What are the next steps?</i> |
| Noon | Lunch |
| | <i>Keynote address by Jack Layton, Toronto Councillor
and Co-Chair of the City of Toronto's Environmental Task Force</i> |
| 1:00 | Sediment Quality in the Toronto RAP - Duncan Boyd, MOE |
| | The link between sediment chemical and biological attributes - Trevor Pawson, MOE |
| 1:35 | Sediment Workshop - Gail Krantzberg, MOE and Kelly Burch, Penns. Dept. of Env. Prot. |
| | A series of presentations and discussion on assessment and interpretation of sediment quality data, to facilitate decision making with, examples of applications to the Toronto and Region RAP and other delisting strategies for other impairments. |
| 3:15 | Round-Table Discussion - Roles for the IJCWQB |
| 4:00 | Comments from the IJC Commissioners |
| 4:30 | Adjourn |

APPENDIX 3

LIST OF PARTICIPANTS

Usman	Ahmed	Ontario Ministry of Municipal Affairs and Housing	Chuck	Ledin	Wisconsin Dept. of Natural Resources
Damian	Albanese	City of Mississauga	F. Ivan	Lorant	Dillon Consulting Limited
Carol	Ancheta	Environment Canada	Tija	Luste	Waterfront Regeneration Trust
Aileen	Anderson	Toronto Bay Initiative/Harbour Terrace	Katie	MacDonald	Task Force to Bring Back the Don
Garth	Armour	City of Toronto	Ann	MacKenzie	International Joint Commission
Suzanne	Barrett	Waterfront Regeneration Trust	Gord	MacPherson	Toronto & Region Conservation Authority
Richard	Boehnke	Etobicoke	Percy	Magee	Natural Resources Conservation Service
Helen	Boehnke	Etobicoke	Deborah	Martin-Downs	Gartner Lee Ltd./Don Council
Karen	Boniface	Town of Markham	Craig	Mather	Toronto & Region Conservation Authority
Susan	Bookbinder	Task Force to Bring Back the Don	Madeleine	McDowell	Humber Heritage Committee
Teresa	Bosco	City of Toronto	Bernie	McIntyre	Toronto & Region Conservation Authority
Ted	Bowering	City of Toronto	Steve	McKenna	Works and Emergency Services
Jean	Bowman	King City	Sonya	Meek	Toronto & Region Conservation Authority
Duncan	Boyd	Ontario Ministry of Environment	Monica	Middleton	City of Toronto
Margaret	Buchinger	Don Watershed Regeneration Council	Victor	Mikhilovski	Ontario Centre for Ecology
Kelly	Burch	Pennsylvania Dept. of Environmental Protection	Joan	Miles	Green Tourism Partnership
Steve	Burke	Regional Municipality of Peel	Ros	Moore	Don Watershed Regeneration Council
Brian	Byrnes	Toronto & Region Conservation Authority	Susan	Motkaluk	Sustainable Development and Monitoring Inc.
Linda	Carscadden	Song of Hope	Francis	Murphy	International Joint Commission
Alice	Chamberlin	International Joint Commission	Karen	Pawlowski	Ontario Ministry of Environment
Brian	Chan	City of Mississauga	Trevor	Pawson	Ontario Ministry of Environment
Kay	Chuckman	Sun Row Community Outreach Committee	Bruce	Quick	City of Toronto
David	Cowgill	U.S. Environmental Protection Office	Euan	Reavie	University of Toronto
Beth	Cragg	Task Force to Bring Back the Don	Paul	Rennick	Rennick and Associates
Gail	Cranston	Humber Heritage Committee	Matt	Rueff	Indiana Dept. of Environmental Management
Guy	Demers	Quebec Ministry of Environment & Wildlife	Debbie	Scanlon	Toronto & Region Conservation Authority
Brian	Denney	Toronto & Region Conservation Authority	Wolfgang	Scheider	Ontario Ministry of Environment
Kenneth	Dion	Ontario Streams	Vic	Shantora	Environment Canada
Doug	Dodge	Ontario Ministry of Natural Resources	Keith	Sherman	Severn Sound RAP
Marianne	Douglas	University of Toronto	Dalton	Shipway	Watersheds United
Dave	Dyce	Toronto & Region Conservation Authority	Sunda	Siva	City of Waterloo
George	Elmaraghy	Ohio Environmental Protection Agency	Barry	Smith	Environment Canada
Larry	Field	Toronto & Region Conservation Authority	Brian	Smith	City of Brampton
Anatoliy	Fisenko	Ontario Centre for Ecology	Marta	Soucek	Toronto & Region Conservation Authority
Deborah	Forester	University of Toronto	Eduard	Sousa	Taddle Creek Watershed Initiative
Bonnie	Fox	Conservation Ontario	Holly	Spiro	University of Toronto
Adele	Freeman	Toronto & Region Conservation Authority	Rhona	Swarbrick	Friends of Mimico Creek
Pam	Fulford	Rouge Park	Grant	Taylor	City of Toronto
Nancy	Gaffney	Toronto & Region Conservation Authority	Anna	Tilman	Save the Oak Ridges Moraine
Dicky	Glerum	King City	Helle	Tosine	Ontario Cabinet Office
Michael	Goffin	Environment Canada	Dev	Tyagi	City of Toronto
Robert	Gourd	International Joint Commission, Ottawa	David	Ullrich	U.S. Environmental Protection Agency, Region V
Scott	Green	Scott Green Enterprises	Judson	Venier	Toronto & Region Conservation Authority
Shelly	Grice	City of Toronto	Debbie	Wagdin	Lakefront Owners Association
Lois	Griffin	Humber Watershed Alliance	Andrea	Warren	Region of Peel
Gary	Gulezian	U.S. Environmental Protection Agency	Gill	Watt	King City
Moyra	Haney	Ontario Public Advisory Council	Gord	Weeden	Rouge Park
Suzanne	Hanson	Minnesota Pollution Control Agency, NE Region	Gary	Wilkins	Toronto & Region Conservation Authority
Peter	Hare	Don Watershed Regeneration Council	Peter	Wise	Illinois Environmental Protection Agency
John	Hartig	International Joint Commission	Hardy	Wong	Ontario Ministry of Environment
John	Hopkins	J.L.H. Services Ltd.	Laurie	Wood	Ecoplans Ltd.
Neil	Hutchinson	Gartner Lee Ltd.	Dean	Young	York University
Lawrence	Ignace	Ontario Streams	Patti	Young	Credit Valley Conservation
Beth	Jefferson	Citizens Concerned About the Future of Etobicoke Waterfront			
Rimi	Kalinauskas	Environment Canada			
Manfred	Koechlin	Quinte Watershed Cleanup			
Gail	Krantzberg	Ministry of the Environment			